

FASTENING UNIT FOR SECURING PERIPHERAL COMPONENT INTERCONNECT
CARDS IN PCI SLOTS IN A HOUSING OF A COMPUTER

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority of Taiwanese
5 application No. 092203594, filed on March 10, 2003.

BACKGROUND OF THE INVENTION

1. Field of the invention

This invention relates to a fastening unit, more particularly to a fastening unit for securing
10 peripheral component interconnect cards in a housing of a computer.

2. Description of the related art

Fig. 1 illustrates a conventional fastening member 87 for securing brackets 86 on a frame 85 that
15 defines an opening in a housing 81 of a personal computer 8. The opening exposes peripheral component interconnect cards 84 in respective PCI slots 83 in the housing 81. Each peripheral component interconnect card 84 can be secured to a respective
20 bracket 86 through screw means. The fastening member 87 is in the form of a plate, and includes two opposite ends 871, 873 that are secured to holding members (not shown) in the housing 81 of the computer 8 in a manner to permit the fastening member 87 to press top
25 portions 861 of the brackets 86 against a top end of the frame 85. The aforesaid conventional fastening member 87 is disadvantageous in that detachment of

the fastening member 87 from the holding members for installation or dismounting of a peripheral component interconnect card 84 may result in unstable electrical connection or even disconnection between
5 other peripheral component interconnect cards 84 and terminals (not shown) in the PCI slots 83.

Fig. 2 illustrates another conventional fastening member 97 that includes a seat 971 which has parallel mounting walls 970. Each mounting wall
10 970 has a toothed inner wall face 974. Two adjacent ones of the mounting walls 970 define a mounting space therebetween. A plurality of pressing members 972 (only one pressing member 972 is shown in Fig. 2) are respectively disposed in the mounting spaces in the
15 seat 971, and respectively press the top portions 861 of the brackets 86 against the top end of the frame 85 when the pressing members 972 are disposed at a pressing position. Each pressing member 972 has two opposite toothed side faces 973 which respectively
20 engage the toothed inner wall faces 974 of the adjacent mounting walls 970 so as to retain the pressing member 972 at the pressing position. The aforesaid conventional fastening member 97 is disadvantageous in that the toothed inner wall face
25 974 of each mounting wall 970 and the toothed side faces 973 of each pressing member 972 tend to wear out easily upon each installation or detachment of

the pressing member 972.

SUMMARY OF THE INVENTION

Therefore, the object of the present invention is to provide a fastening unit that is capable of
5 overcoming the aforementioned drawbacks of the prior art.

According to the present invention, there is provided a fastening unit for securing brackets on a frame that defines an opening in a housing of a
10 personal computer. The opening exposes peripheral component interconnect cards in respective PCI slots in the housing. Each of the peripheral component interconnect cards is secured to a respective one of the brackets. The fastening unit comprises: a seat
15 adapted to be mounted on the frame and having at least two parallel mounting walls that define a mounting space therebetween, the mounting space being adapted to receive a portion of one of the brackets; and at least one pressing member that has a pressing part,
20 that is disposed in the mounting space, and that is pivoted to the mounting walls so as to be rotatable relative to the seat between a pressing position, in which the pressing part thereof is adapted to press the portion of said one of the brackets against the
25 frame, and a releasing position, in which the pressing part thereof is adapted to be moved away from the portion of said one of the brackets.

BRIEF DESCRIPTION OF THE DRAWINGS

In drawings which illustrate embodiments of the invention,

Fig. 1 is a fragmentary perspective view to
5 illustrate how a conventional fastening member
secures brackets that are used for securing
peripheral component interconnect cards in PCI slots
in a computer;

Fig. 2 is a fragmentary perspective view of
10 another conventional fastening member;

Fig. 3 is a fragmentary perspective view of the
first preferred embodiment of a fastening unit
according to this invention, illustrating how
brackets in a personal computer are secured by the
15 fastening unit;

Fig. 4 is an exploded perspective view of the
fastening unit of Fig. 3;

Fig. 5 is a side view of the fastening unit of
Fig. 3;

20 Fig. 6 is a fragmentary side view to illustrate
how an interlocking mechanism is disposed at a locking
position so as to lock a pressing member of the
fastening unit of Fig. 3 at a pressing position;

Fig. 7 is a fragmentary side view to illustrate
25 how the interlocking mechanism is moved from the
locking position to an unlocking position so as to
permit movement of the pressing member of the

fastening unit of Fig. 3 from the pressing position to a releasing position;

Fig. 8 is a fragmentary side view to illustrate how the pressing member is moved from the pressing position to the releasing position;

Fig. 9 is an exploded perspective view of the second preferred embodiment of the fastening unit according to this invention;

Fig. 10 is fragmentary side view to illustrate how an interlocking mechanism is disposed at a locking position so as to lock a pressing member of the fastening unit of Fig. 9 at a pressing position;

Fig. 11 is fragmentary side view to illustrate how the interlocking mechanism is moved from the locking position to an unlocking position so as to permit movement of the pressing member of the fastening unit of Fig. 9 from the pressing position to a releasing position; and

Fig. 12 is a fragmentary side view to illustrate how the pressing member is moved from the pressing position to the releasing position.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

For the sake of brevity, like elements are denoted by the same reference numerals throughout the disclosure.

Figs. 3 to 6 illustrate the first preferred embodiment of a fastening unit 100 according to the

present invention. The fastening unit 100 is used to firmly secure brackets 56 on a frame 55 of a housing 51 of a personal computer 5. Each peripheral component interconnect card 54 is secured to a respective
5 bracket 56 through screw means (not shown) that extend through an ear 562 of the bracket 56. The fastening unit 100 includes: a seat 1 adapted to be mounted on the frame 55 and having a supporting wall 11 and a plurality of parallel mounting walls 12 that project
10 from the supporting wall 11, each adjacent pair of the mounting walls 12 defining a mounting space 13 therebetween, the mounting space 13 being adapted to receive a top portion 561 of one of the brackets 56; and a plurality of pressing members 2, each of which
15 has a pressing part 222, each of which is disposed in the mounting space 13 between two adjacent ones of the mounting walls 12, and each of which is pivoted to the two adjacent mounting walls 12 so as to be rotatable relative to the seat 1 between a pressing
20 position (see Fig. 6), in which the pressing part 222 thereof is adapted to press the top portion 561 of said one of the brackets 56 against the frame 55, and a releasing position (see Fig. 8), in which the pressing part 222 thereof is adapted to be moved away
25 from the top portion 561 of said one of the brackets 56.

A plurality of interlocking mechanisms 3 are

provided to lock the pressing members 2 at the pressing position, respectively. Each of the interlocking mechanisms 3 includes a first engaging member 111 that is formed on and that projects from the supporting wall 11 of the seat 1 into the mounting space 13 between two adjacent ones of the mounting walls 12, and a second engaging member 32 that is mounted movably on the respective pressing member 2. The second engaging member 32 has an engaging end 323 that is releasably engageable with the first engaging member 111 (see Fig. 6) so as to lock the respective pressing member 2 at the pressing position and so as to prevent rotation of the respective pressing member 2.

Each two adjacent ones of the mounting walls 12 of the seat 1 are formed with a pair of opposing pivot grooves 121. Each pressing member 2 is adapted to be disposed above the top portion 561 of the respective bracket 56, and includes a base wall 21 that has first and second ends 211, 212 and two opposite sides transverse to the first and second ends 211, 212 and parallel to the adjacent mounting walls 12, two opposite side walls 22 that respectively project from the opposite sides of the base wall 21 in a first transverse direction relative to the base wall 21, and two opposing pivot studs 23 that are disposed adjacent to the second end 212 of the base wall 21

and that respectively and oppositely project from the side walls 22 in a second transverse direction relative to the side walls 22 into the pivot grooves 121 in the two adjacent mounting walls 12 so as to permit rotation of the pressing member 2 relative to the seat 1.

The pivot groove 121 in each mounting wall 12 has an open end 1210 that opens downwardly. The pivot studs 23 of each pressing member 2 are respectively inserted into the corresponding pivot grooves 121 through the open ends 1210. The side walls 22 of each pressing member 2 are respectively formed with two opposing arcuate slots 232, each of which is disposed adjacent to a respective one of the pivot studs 23 and each of which is defined by a slot-defining wall that has two opposite ends 2321, 2322 (see Fig. 5). Each two adjacent ones of the mounting walls 12 of the seat 1 are further formed with a pair of opposing limiting studs 122 that respectively project therefrom into the arcuate slots 232 in the side walls 22 of the respective pressing member 2 so as to support the respective pressing member 2 on the adjacent mounting walls 12. One of the opposite ends 2321 of the slot-defining wall of each arcuate slot 232 comes into contact with the respective one of the limiting studs 122 when the respective pressing member 2 is positioned at the pressing position (see Figs. 6 and

7). The other of the opposite ends 2322 of the slot-defining wall comes into contact with the respective one of the limiting studs 122 when the respective pressing member 2 is positioned at the releasing position (see Fig. 8). Accordingly, rotation of each pressing member 2 is limited between the pressing position and the releasing position.

Each pressing member 2 further includes a leg 24 that projects from the second end 212 of the base wall 21 in the first transverse direction, that is opposite to the side walls 22, and that has a free end which defines the pressing part 222 of the pressing member 2. The free end of the leg 24 abuts against the top portion 561 of the respective bracket 56 when the respective pressing member 2 is disposed at the pressing position (see Figs. 6 and 7), and is moved away from the top portion 561 of the respective bracket 56 when the respective pressing member 2 (see Fig. 8) is moved from the pressing position to the releasing position.

In this embodiment, the first engaging member 111 of each interlocking mechanism 3 is in the form of a bar 111' that extends between the adjacent mounting walls 12. The side walls 22 of each pressing member 2 define a plate-receiving space 220 therebetween. The second engaging member 32 is in the form of a sliding plate 32' that is slidably received

in the plate-receiving space 220 between the side walls 22 of the respective pressing member 2, that has an engaging end 323 disposed adjacent to the second end 212 of the base wall 21 of the respective pressing member 2, and that is slidable in a third transverse direction relative to the first and second transverse directions between a locking position (see Fig. 6), in which the engaging end 323 of the sliding plate 32' extends outwardly of the plate-receiving space 220 and is disposed above and confronts the bar 111' when the respective pressing member 2 is positioned at the pressing position so as to prevent rotation of the respective pressing member 2 in a first direction, and an unlocking position (see Fig. 7), in which the engaging end 323 of the sliding plate 32' is moved away from the bar 111' and into the plate-receiving space 220 so as to permit rotation of the respective pressing member 2 in the first direction.

The base wall 21 of each pressing member 2 is formed with a through-hole 213 that is defined by a hole-defining wall, and a first mounting stud 214 that projects from the hole-defining wall into the through-hole 213. The sliding plate 32' is formed with a rib 320 that projects into the through-hole 213, and a second mounting stud 322 that projects from the rib 320 toward the first mounting stud 322. The

interlocking mechanism 3 further includes a coil spring 4 that is sleeved on the first and second mounting studs 214, 322 so as to urge the sliding plate 32' to move to the locking position (see Fig. 6) when the respective pressing member 2 is positioned at the pressing position.

The side walls 22 of each pressing member 2 are formed with guiding protrusions 215 projecting therefrom into the plate-receiving space 220 and cooperatively defining two opposing guiding channels 216 thereunder. The sliding plate 32' has two opposite sides that are respectively formed with two opposing wings 321 that are slidably received in the guiding channels 216 between the side walls 22 of the respective pressing member 2.

Each interlocking mechanism 3 further includes a limiting tongue 221 that projects from the leg 24 of the respective pressing member 2 in the third transverse direction away from the first end 211 of the base wall 21 and that is disposed at a position adjacent to the second end 212 of the base wall 21 so as to be disposed below and to confront the bar 111' when the respective pressing member 2 is disposed at the pressing position, thereby preventing rotation of the respective pressing member 2 in a second direction opposite to the first direction.

Figs. 9 to 12 illustrate a second preferred

embodiment of the fastening unit 100' that is modified from the previous embodiment shown in Fig. 3. In this embodiment, each two adjacent ones of the mounting walls 12' of the seat 1' respectively have pivot ends that are respectively formed with two opposing grooves 121'. A supporting wall 11' of the seat 1' extends between and interconnects the pivot ends of the mounting walls 12' and is formed with a notch 14' which opens downwardly and which is defined by a notch-defining wall. The notch-defining wall has a top wall portion 141' that is disposed above the grooves 121' and that defines the first engaging member 111 of the respective interlocking mechanism 3'. Each pressing member 2' includes a base wall 21' that has first and second ends 211', 212' and two opposite sides transverse to the first and second ends 211', 212' and parallel to the adjacent mounting walls 12', that defines the pressing part 222 of the pressing member 2', that is adapted to abut against the top portion 561' of the respective bracket 56' (see Fig. 10) when the respective pressing member 2' is disposed at the pressing position, and that is adapted to move away from the top portion 561' of the respective bracket 56' (see Fig. 12) when the respective pressing member 2' is moved from the pressing position to the releasing position. Each pressing member 2' further includes a pair of pivot

studs 23' that project oppositely from the second end 212' of the base wall 21' at the opposite sides of the base wall 21' into the grooves 121', and a curved wall 24' that is formed with an elastic part 32' having
5 an engaging protrusion 323' which defines the second engaging member 32 of the respective interlocking mechanism 3' and that extends curvedly from the first end 211' of the base wall 21' toward the second end 212' of the base wall 21' in such a manner that the
10 engaging protrusion 323' elastically engages the top wall portion 141' of the notch-defining wall when the respective pressing member 2' is disposed at the pressing position. The elastic part 32' is elastic so as to permit disengagement between the engaging
15 protrusion 323' and the top wall portion 141' of the notch-defining wall upon being pressed (see Fig. 11), thereby permitting rotation of the respective pressing member 2' from the pressing position to the releasing position.

20 By virtue of the pivot action of the pressing members 2 (2') on the seat 1 (1') during loosening or fastening of the brackets 56 (56') on the frame 55 (55') of the housing 51 (51'), the aforesaid drawbacks as encountered in the prior art can be
25 eliminated.

With the invention thus explained, it is apparent that various modifications and variations can be made

without departing from the spirit of the present invention. It is therefore intended that the invention be limited only as recited in the appended claims.